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Effect of 2wt% Cu Addition on the Tensile Properties and Fracture Behavior of Peakaged Al-6Si-0.5Mg-2Ni Alloy at Various Strain Rates

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Abstract : Effect of 2wt% Cu addition on tensile properties and fracture behavior of Al-6Si-0.5Mg-2Ni alloy at various strain rates were studied. The solution treated Al-6Si-0.5Mg-2Ni (-2Cu) alloys, were aged isochronally for 1 hour at temperatures up to 300oC. The uniaxial tension test was carried out at strain rate ranging from 10-4s-1 to 10-2s-1 in order to investigate the strain rate dependence of tensile properties. Tensile strengths were found to increase with ageing temperature and the maximum being attained ageing for 1 hr at 225oC (peak aged condition). Addition of 2wt% Cu resulted in an increase in tensile properties at all strain rates. Evaluation of tensile properties at three different strain rates (10-4, 10-3 and 10-2 s-1) showed that strain rates affected the tensile properties significantly. At higher strain rates the strength was better but ductility was poor. Microstructures of broken specimens showed that both the void coalescence and the interface debonding affect the fracture behavior of the alloys.

Keywords : Al-Si-Mg-Ni-Cu alloy, tensile properties, strain rate, SEM.
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